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Origin of Fires.

"The origin of fires in London," says the *Fireman's Gazette*, "has now been recorded for about twenty years. And it has been observed that not only the most frequent causes from year to year have kept the same ratio, but even those which are so peculiar that one would never expect to hear from them again. From the long list given, we copy a few.

Curtains	2,511	Smoking tobacco	166
Candles	1,178	Reading in bed	22
Flues	1,555	Sewing in ditto	4
Gas	932	Smoking in ditto	2
Stoves	494	Spontaneous combustion	43
Incendiarism	89	Cat	19
Carelessness	100	Dog	6
Intoxication	80	Clothes-horse upset by monkey	1
Lucifers	80	Lightning	8
Children playing with lucifers	45	High tide	1

An inspection of the above list will disclose a deal of curious information. Who would have supposed curtains to be so dangerous? And since they can be so easily dispensed with, without injury to comfort or taste, would not common prudence seem to require it? Reading in bed appears to be seven times as dangerous as smoking—and a cat is more than three times as hazardous as a dog."

Explosion of an Infernal Machine.

Intelligence has been received at Berlin that a Prussian merchant-schooner, belonging to Stralsund, had been lost in the Gulf of Finland, from coming in contact with one of Dr. Jacobi's infernal machines. The schooner was laden with supplies for the English fleet, and blew up by the explosion of one of the submarine inventions sent afloat by the Russians in those waters.

Saltpetre is very scarce and dear at present, owing to the war in Europe.

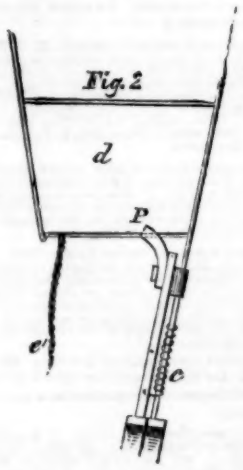
Improvement in Windmills.

The accompanying perspective view, (figure 1,) and the section view, (fig. 2,) represent an improvement in Windmills, for which a patent was granted to A. Lempcke, of Pleasant Mount, Pa., on the 8th, of last May.

The nature of the invention consists in the peculiar means employed for regulating the speed of the mill according to the velocity and power of the wind, by devices for feathering the sails or wind vanes; also a brake for stopping the mill.

The machinery is secured to a strong frame in the lower part of a building, and to a section hollow column, which sustains the shafting; the said hollow column being sustained by the four metal braces bolted to the cross sleepers of the under frame. A is a hollow shaft supported in the section hollow column by a collar, a'. In the interior of the hollow shaft, A, is the solid shaft, B', which is intended by gearing, or by pulleys and belting, to move the machinery in the building. This shaft has a bevel wheel, B, on its top, which gears into the bevel wheel, D, of the horizontal sail shaft, C. On the hollow shaft, at its shoulder, there spring out two arms, a, a, which carry the standards to support the machinery connected with the sail shaft. The shaft, C, revolves in bearings in the upper part of the standards of the arms, a, a. The hollow shaft, A, can turn round and carry the shaft, C, and its devices with it. To the outer end of shaft C, there is attached a hub, b, in which radial arms, c, c,

LEMPCKE'S PATENT WINDMILL.

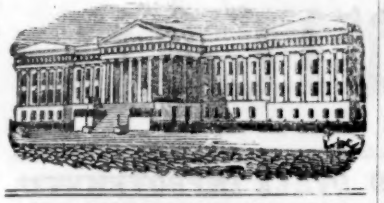


are secured, but allowed to turn partially. Fig. 2 is a section view of one of the arms, and a sail, d, connected at P. To these arms the sails or vanes, d, d, are connected and supported by spring rods, e, e. These rods with the arms, c, form the frames of the sails; these may be made of wood or sheet metal for small mills. D' is a sleeve on shaft C, and it can slide back and forth on the shaft, and its object is to regulate the sails. It has a circular rim, d', on its outer end, to which chains, e', are attached, and which connect the rods, e, of the sails, with the said sleeve. Two lever rods, k are connected by pivots to the sliding sleeve, D', then pass horizontally to the hollow shaft, A, and through an opening in the flange on its top; then vertically downwards (one on each side) to a collar, a', on the hollow column: this collar is connected by a chain, k', at m, to a lever, C', which has a weight, H, at its long end, and is attached at its inner end to a graduated post with holes in it, by a pin. As the sleeve, D, is connected by chains, e', to the sails, it follows that when this sleeve is drawn further back from the hub, b, the sails will become more stretched or extended to the wind, and *vice versa*. The weighted lever, G', regulates this by its action on the lever rods, k. By shifting the lower end of the lever G', into any of the holes in the post at m, the amount of strain on the sleeve D' will be altered, and thus the pressure exerted on the sails to give them such exposure as may be desired, will be regulated. The pressure of the wind on the sails is thus regulated by the weighted lever; the same as the steam in a boiler by the safety valve.

E is a *brake* for stopping the mill. It is connected by a pivot at one end, to the sliding sleeve, D', and has its fulcrum at i', on a slide rest. It has a clasp or fork on its end, below the screw part of shaft C. F is a vibrating lever; it has a projection on its end on which the brake E rests, and its fulcrum is at g, on the arm, a. Its end at the hollow shaft is connected to a rod or lever (not shown) which extends downward and is connected by a flange at a''', to the forked lever L, one end of which is connected to the stirrup, N. By placing the foot on this stirrup, the end of lever F, next the hollow post, A, is drawn down; consequently, the projection on which the brake rests, is thrown up, and the clasp or fork of ake E, is forced against the screw part of shaft, C, thus performing the office of a brake, and pushing forward the sliding sleeve to slacken chains e', and feather the sails; so as to stop the mill.

If designed for operating a pump, instead of having the gearing, D, B, to rotate the shaft B', the said shaft should be the connecting rod of the pump, attached by a crank to shaft C; so as to give a reciprocating motion to the pump rod. A screw turned by a hand wheel may be employed to keep the stirrup down when the mill is stopped. In localities (and, they are numerous in our country) where water is scarce, and steam power dear, windmills are very useful for driving various machines, and such as small grinding mills, pumps, saws, etc. Wherever a windmill can be employed more economically than hand or animal power, common sense suggests its adoption as soon as possible. A working model of this Windmill will be on exhibition at the Illinois and Michigan State Fairs, to be held on the first and second weeks of next month, (October.)

More information may be obtained respecting this windmill, by letter addressed to the inventor, Mr. Lempcke, or H. W. Brown, at Pleasant Mount, Pa.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING SEPT. 11, 1855.

CUTTING STANDING COTTON STALKS—J. W. Bocage, of Cypress Mills, Ark.: I claim the employment or use of a series of circular saws, d', placed upon a vertical shaft, J, and rotating between the bars, e, of a metallic frames, L, the saws and frame being placed upon or attached to a proper carriage, and arranged as shown.

[This is a very excellent improvement. An engraving with a full description of the same, will be found on another page.]

LANTERN GUARDS—C H. Butterfield, of South Lancaster, Mass.: I claim making the guard movable by means of the hinges and catches, as described, or any other substantially the same.

SAW MILL CARRIAGES—B. S. Eastham, of Blanchester, Ohio: I claim the wedge blocks, 3, 3. 3, 3, worked by the rods, 5, 5, and springs, 7, 7, for elevating the steadying strips, 4, 4, up against the log, for holding it steady while being sawnd; the whole being operated by the machinery described and represented, for the purposes stated.

I also claim the combination of the catches, 8, 8, attached to the bottom of the wedge blocks and ratchets, 6, 6, for holding the wedge blocks to their place, after elevating the strips against the log, for the purposes stated.

HARVESTING MACHINES—J. E. Heath, of Geneva, O.: I claim, first, suspending the reciprocating bar, n, by means of the stirrups, q and r, near the ground, in front of or behind the driving wheel, in or near the same plane as the finger board, in combination with the angular friction roller, the whole being arranged and operated in the manner and for the purpose set forth.

Second, the adjustable pressure bar, x, constructed and arranged as described, in combination with the cutter teeth, t, and fingers, u, for the purpose specified.

LIFE-PRESERVING BED FOR SHIPS—G. K. Hooper, of Boston, Mass.: I claim my improved manufacture, or life-preserving spring pontoon bed, as made of a wooden frame or mattress, a series of pontoons and a series of springs, arranged and connected together, substantially as specified.

And I also claim the improvement of making each of the pontoons, B B, of less depth at its inner edge, than it is at its outer one, or that which is hinged to the frame, when the said pontoon is of such size as to project beneath the shoulder blades of a person, when reposing upon the mattress, B, the object of so constructing said portion having been heretofore specified.

SECURING KEYS IN CONNECTING RODS, &C.—Geo. H. Coney, of Boston, Mass.: I claim the combination of a screw nut and a screw, divided longitudinally, as described, as a means by which to hold the key in its place.

AIR POWER MACHINE.—John Clark, of Cambridge Township, Pa.: That which I design to claim, as my particular invention, is the air-tight cylinder and bellows, of whatever material they may be made, for the purpose of obtaining a motive power from the expansion and contraction of the air, and to whatever use it may be applied.

[Here is an air engine which operates of itself, by the natural contraction and expansion of the atmosphere, without the assistance of fire or the consumption of any species of fuel. Verily, the problem of our old friend Ericsson is at last solved. He has been trying for years with a perseverance worthy of better luck than has so far attended him, to construct an air engine, which, at an expense of nothing or next to nothing, should give out a useful power. To be thus distanced—thus shorn of his laurels, after all his costly experiments, grandiloquent essays, and splendid failures, by an unpretending backwoodsman, is the very essence of misfortune. Alas! how mutable are all human events. But notwithstanding the issue of the above new patent, our opinion of air engines remains unchanged,—they are of no practical value.]

FOLDING AND MEASURING CLOTH—J. D. Elliot, of Leicester, Mass.: I claim, in connection with the pivoted vibrating blades, E E, the rod and swivel, for causing said blades to make a half revolution during each vibration, substantially as described

I also claim the friction bar or brake, C, in combination with the rolls, B D, for preventing the cloth, by the momentum of the blades, from paying off faster than it is folded, substantially as described.

CHARGER FOR FIRE-ARMS, &C—Josee Johnson, of Washington, D. C.: I claim, first, the combination of the projecting ball, C, cylinder, A, and cut-off valve, E, arranged and combined in the manner and for the purposes described and set forth.

Second, I claim using clamp, B, in connection with the charger, for the purpose of facilitating the rapid completion of the process of loading fire-arms, as described.

HERNIAL TRUSSES—Frances Grace Mitchell, M. D., of New York City. I do not claim the form or application of the pad.

But I claim the mechanical arrangement on the back of the pad, on the metal plate, which consists of a lever, which presses a steel spring into a longitudinal groove, formed in the center of the metal plate, on the back of the pad.

HOMINY MACHINES—Jonathan Nesbitt, Jr., and T. J. Cosley, of Clear Spring, Md.: We claim the construction of the beater, as set forth, the same consisting in a beater provided with four faces, two of which are plane or squared, and two provided with the inclined or screw like projections, in the manner and for the purposes described.

We claim, in combination with such beater, the two rows of spurs in its plane faces, as set forth.

ROTARY STEAM ENGINE—C. E. Off haus, of Newark, N. J.: I claim, first, the construction of the revolving piston in rotary engines, with piston valves, said piston valves being made to open and shut by the action of the steam, without any extra friction, against any part on the inside cylinder.

Second, I claim the arrangement of the openings and passages in the side plates, E E', in connection with the grooves, v v', in the cylinder, forming a communication between the inner sides of the piston valves, and the steam and exhaust passages alternately, in the manner and for the purpose as described.

Third, I claim the construction of the piston valves and frames, and the manner of changing the position of the same, when the motion of the engines requires to be reversed.

KNITTING MACHINES—Walter and Jonas B. Aiken, assignors to Herrick and James I. Aiken, of Franklin, N. H.: The general form and construction of the several parts of our machine are new, but we shall confine our claim to the most essential parts, as these cannot be materially varied in construction in the principles which govern their action, or in the nature of the results produced.

First, we claim the construction of the hollow circular needle plate, having grooves in its outer surface as described, for the object specified.

Second, we claim the loop regulator, as described, for the object specified.

EXTRACTING VEGETABLE OILS—Wm. Wilber, of New Orleans, La.: I claim a kettle for steaming or boiling and moistening crushed oleaginous seeds, into which steam is admitted, whilst it is surrounded by steam, so that the cooking and moistening be done by the direct and indirect action of steam, substantially as described.

SEED PLANTERS—Freeman Plummer and G. B. Rollins, of Manchester, Ind.—We claim links, r r, in combination with the adjustable rods, s' s, when constructed and arranged in the manner and for the purpose set forth.

CONICAL PLATE RAILROAD CAR SPRINGS—Jno. J. Speed, Jr., and J. A. Bailey, of Detroit, Mich.: We do not claim merely arranging springs, as such has before been done.

But we claim, in metal, conical or dish-shaped disk car springs, arranged in sets or pairs, one above the other, as described, providing the splitting of the edges of the disks by expansion, and effecting free unbroken compensation or lateral play, for the radial elongation of the fibers, when the spring is exposed to sudden or heavy compression, and insuring equality of elasticity all round, by making the disks with radial corrugations, and arranging them for operation together, substantially as specified.

[The disk springs, to which allusion is made in the above claim, are simply concave steel plates, resembling, in outward appearance, the saucers of common coffee cups. These disks are placed within a case or cylinder the lower disk resting, like a saucer, on the bottom of the cylinder; the disk next above is reversed or placed bottom up, its periphery resting on the periphery of the lower disk. In this manner the disks are arranged in pairs, above each other, a plunger being fitted to the top of the cylinder, on which the weight to be sustained rests. It is plain that the elasticity of the disks, thus arranged, will be considerable, and that they will yield more or less, according to the weight brought upon them.

Disk springs of this kind have long been known; they are peculiarly adaptable to car springs, for they occupy no more space than the round india rubber springs now in common use. But the trouble with the old-fashioned disk springs is, that, after being in use for a time, they split and flatten out, thus losing their elasticity and becoming worthless.

The improvement of Messrs. Speed and Bailey consists in corrugating the disks, instead of having them plain as heretofore. This invention adds new strength to the plates, and entirely obviates the serious objections we have just named. We regard the improvement as a capital one. We understand that it has been practically tested, with entire success. It is well worthy the attention of Railroad Superintendents.]

TREBLING A SINGLE THREAD—Anson A. Swift, assignor to himself and Samuel L. Hill, of Florence, Mass.: I do not claim the principle of trebling a thread or strand of silk, by enchaining loops formed therein; nor do I claim the combination of a stationary knob, an endless band, and two hitching heads or knobs (the same being movable,) fixed to said band at equal distances apart, such being the subject of the patent of Kelsea: but as I employ but two hitching heads only, and apply one of them and the strand bobbin in a frame, to have a reciprocating motion, as described, while the other, and the reeling mechanism, I arrange in a stationary frame.

I claim such an improved arrangement and combination of the hitching heads, movable and stationary frames, whereby I am not only enabled to dispense with an endless band and one hitching head, but employ a reciprocating frame, and thereby afford an attendant on the machine the advantage of being near the reeling mechanism as explained.

SAWING MARBLE—Jno. Cochrane, of Baltimore, Md.: I claim the hanging of two saws in one gate at any required angle with each other, in combination with the angular guide, D and E, the slides, k l and m n, and the accommodation links, a b and c d, or their equivalents, for the purpose of sawing two inclined or tapering sides of a block of marble or stone, at one operation.

[This is the first patent granted in the great contest for the best marble sawing machine. Mr. Cochrane is either particularly lucky in obtaining this grant, or else he is very unlucky. His patent will have to run a long gauntlet of interferences, from which, if it escapes unscathed, he will be fortunate; but should it appear that some other inventor had discovered the same thing a day or two before him—of which there is a likelihood—then will he be unfortunate. The receipt of a patent is not always the guarantee of its continued possession. A subsequent applicant, if he produces evidence of prior invention, may, under our laws, cause the first patent to be annulled, and himself obtain the grant.

The issue of one solitary patent on marble saws this week, strikes us as a rather singular circumstance. It savor of unfairness somewhere. If our calculations are correct, there were, when Mr. Cochrane's document left Washington, between fifty and a hundred caveats and patent applications for marble saws on file in the archives of the Patent Office. Why his case should be singled out, and placed in advance of all others, seems a little strange. It is barely possible that, living within two hours ride of the Patent Office, and having promptly read the $10,000 offer, the inventor promptly made his model, promptly put in his application, obtained a prompt examination of his case, and a prompt grant of the patent—the whole business having been so promptly performed as to receive its finishing stroke before the eyes of other inventors were fairly opened. All this, we say, is barely possible, and yet it looks, upon its face, rather improbable. We make no charge, however, against the Patent Office, or any of its officers. With few exceptions, they are all high-minded gentlemen, who would not stoop to the performance of an unjustifiable action. But we cannot help thinking, that if the same degree of promptness had been exhibited towards othe applicants that appears to have attended the case of Mr. Cochrane, the list of patents granted this week would have been considerably larger than it is.

On the other hand, perhaps the examiners, finding the present case slightly in advance, and seeing a great rush behind, deemed it proper to issue this patent, so as to have a convenient reference before them on which to reject the remaining majority. This course would undoubtedly save the Office much labor, while it would in no way interfere with the ultimate rights of other inventors.

The device above patented is similar in general construction to about two-thirds of all the various plans for sawing marble that we have seen. It consists, if we understand it properly, of a horizontal saw gate, furnished at each end with a bar on which the saws slide laterally, in accordance to the movements of the gate; with adjustable guides for arranging the cutting angle. This principle, though apparently a very good one, involves considerable friction—more than other plans that we have examined. Which arrangement will turn out to be really the best, remains to be yet ascertained by trial.]

COTTON SEED HULLERS—Wm. Wilber, of New Orleans, La.: I claim the arrangement of the hopper, B, revolving toothed cylinders, D E, breast plate, F, crushing and grinding cylinder, G, concave bed, H, with removable extended bed plate, J, and toothed cylinder, L, revolving in its toothed case, K', in the manner and for the purpose set forth.

I also claim the series of graduated blasts, R T W, and screens, e f g h i j k, for the purpose of separating the oleaginous from the other impurities of the seeds, they being arranged and operating, substantially in the manner and for the purpose set forth.

CRIMPING PAPER FOR STICKING PINS—J. B. Terry, of Hartford, Conn.: I claim the use of the hinged clamps, b b', or equivalents operating together with the folding rod or former, g, to crimp the paper substantially as set forth.

OPERATING RECIPROCATING SAWS—O. S. Woodcock, of Connersville, Ind.: I claim attaching the lower end of the saw, B, directly to the upper end of the pitman, D, by a pin, e, which forms a joint connection, the pitman working on a suitable fulcrum or bearing, d, below the pin, e, substantially as shown, for the purpose specified.

[In this improvement the saw is hung in a reciprocating gate, in the usual manner, except that the lower end of the saw, instead of being attached to the cross piece of the gate frame, is fastened to a small block, which is pivoted to the cross piece. The pitman, instead of being attached directly to the cross piece, is fastened to the pivoted block, so that when the pitman passes its crank centers, it will turn the block a little, and carry the lower end of the saw in and out from the stuff which is being cut. When the saw comes down, it will be carried in on a slight angle against the stuff; when it rises it will be correspondently carried out. This alternate carrying in of the lower end of the saw during its descent, and its move out, during the rise, are important advantages; the manner in which they are obtained is simple, but quite ingenious. Saws thus hung will cut faster in descending with the same consumption of power than the ordinary saws, and they will also rise easier, since their teeth will not drag; there will likewise be ample opportunity for the sawdust to escape. We regard the above as a very valuable patent.]

BEDS FOR SHINGLE MACHINES—H. J. Weston, of Buffalo, N. Y.: I do not claim the general principle of splitting off a piece from the block, thick enough to make two or more shingles, and then subdividing it. Neither do I claim the combination of two or more riving knives for that purpose.

But I claim making the yielding bed, R R', in two parts, and arranging those parts in the manner described and represented.

GRINDING COTTON AND OTHER SEED FOR THEIR OILS—Wm. Wilber, of New Orleans, La.: I claim the application of jets of steam for lubricating the surfaces of cylinders for grinding cotton seeds, to prevent their gumming up or being clogged by the ground material, substantially in the manner described.

DOUBLE ACTING FORCE PUMP—Thos. J. DeYampert, of Mobile, Ala.: I claim the system of crossed levers and connecting rods herein described, when placed and operated in the intermediate or central chamber, A, and when combined with two or more pistons, working in cylinders, which radiate from the central axis or fulcrum of said levers, substantially in the manner and for the purposes set forth.

[This is a very ingenious invention, whereby several pistons may be simultaneously operatd by one brake. It will be illustrated by engravings in a short time in this journal.]

HOROMETERS—Amos Abbott, of Manchester, N. H. Patented in England, Sept. 20, 1854: I do not claim the invention of any part of the apparatus connected with the instrument for the purpose of taking altitudes of objects, or of solving of problems in plane trigonometry; nor the tables on the back of the instrument; nor the projection of any of the lines as such.

But I claim an instrument upon which are delineated projections of latitude and longitude, within an arc of a circle, combined with the arm, O K, and scale, F G, or their equivalent, substantially in the manner described, for the purpose of solving useful problems in spherical trigonometry, as above mentioned, without the usual mathematical calculations.

I also claim the employment, in mathematical instruments, of magnetism, to keep a slide at right angles, or any given angle to a straight edge, and at the same time allowing it to slide freely upon the straight edge, substantially as set forth.

RE-ISSUES.

AIR HEATING STOVES—J. M. Thatcher, of Jersey City, N. J. Patented March 23, 1852.: I claim making the bottom plates of the flue spaces of air heating furnaces or stoves, for the passage of the products of combustion, outward or inward, among or around the air passages, inclining inward and downward towards the fire chamber, substantially as described, for the purpose of facilitating the increase of the heating surface, without the inconvenience of the accumulation of ashes, soot, and other solid matter, on such plates as set forth.

And I also claim the combination of the inverted domes or fustrums, F I M, described for the purpose of effecting the connection between the lower ends of the fire or draft flues, and carrying the air through them to the spaces between the cylinders or tubes.

GRAIN DRYERS—John Massey, of New York City. Patented April 17, 1849: I claim in the method of kiln drying grain, the employment of an endless pan or apron, made of metal, and passing around drums, or the equivalents thereof, substantially as specified, in combination with and operated within a heating chamber, substantially as set forth.

DESIGNS.

TABLE CASTERS—Edward Gleason, of Dorchester, Mass.: I claim the wreath on the circular projection, h, and the embellishments on the doors, B, and feet, C, when the whole are arranged and formed as herein shown to constitute an ornamental design for table casters.

[This is one of the best and most beautiful articles of its kind that we remember to have seen. The caster is made somewhat in the form of a miniature house, with octagonal sides. Each side is a door. If you turn the handle, all the doors open and bring out the casters, convenient and ready for use. Turn the handle again, and the doors all close, returning the casters within, out of sight.]

PARLOR GRATES—James Andrews, assignor to Andrews & Dixon, of Philadelphia, Pa.

STOVES—James. H. Conklin, of Peekskill, N. Y., assignor to S. B. Sexton, of Baltimore, Md.

Riehl's Patent Book Trimmer.

MESSRS. EDITORS—In your list of "Issued Patents" last week, there is an error, in the one obtained by M. Riehl, for trimming books. It reads, "M. Riehl, of Cincinnati, Ohio," It ought to be, "M. Riehl, of Philadelphia, Pa." Will you please make the correction.

HOWARD & RIEHL.

Philadelphia, Sept. 11, 1855.

[The official copy of the claims as published by us, located Mr. R. at Cincinnati.

The Most Magnificent Steamboat in the World

This steamboat, just remodeled, refitted, and set afloat on the waters of the Hudson, is the most superb and gigantic floating palace in the world. She has a length of 370 feet, and 48 of beam. Her engine has a cylinder 76 inches in diameter, with a stroke of 15 feet. Her wheels are 46 feet in diameter, and are unequalled in size by any steamship. With room to bed "and board" in voluptuous style one thousand people, she can carry upon her ample decks 250 tuns of freight. In good running order she can run at the average rate of *twenty miles* an hour. With this great speed those who read by her chandeliers will not experience interruption from the rattling of the glass drops, so firmly is she put together. Enormous as is her bulk and rapid her movement, the *New World* draws but 5 1-2 feet of water. She has 540 state-rooms, 30 family state rooms, 4 large club rooms, one elegant and spacious bridal chamber, two large ladies' dressing-rooms, and a noble fore-and-aft large saloon 120 feet long; the state-rooms are in three tiers. The great mass of this noble steamboat, when dashing through the water, has an effect upon the mind like witnessing the Falls of Niagara—that of admiration and awe. The fitting up of all the rooms is rich and tasteful beyond description. The elegance and costliness of the lace curtains, the rosewood and gilt furniture, the marble, the cut glass and porcelain, the numerous oil paintings of great merit and greater interest, we must pass by. Her appointments throughout are enough to make us proud of our country, which is acknowledged by all travelers to be a century ahead of any other for large, magnificent, and swift steamboats.

It was supposed by many that when the Hudson River Railroad was completed, it would greatly injure the steamboat business on the river; but the fact is otherwise. Never, in the whole history of New York, have the North River steamboats carried so much goods and so many passengers as during the present summer. All the large steamboats, which used to have their lower decks open and free, have had their decks stowed full of bales and boxes every trip, and oftentimes in the state-rooms not a single berth to be obtained at the hour of sailing. The steamboat business on the Hudson has largely increased, is increasing, and will continue to increase The owner of the *New World* is Isaac Newton, Esq., who deserves great credit for his taste, enterprise, and the noble spirit he has shown to improve the accommodations of travelers.

Newfoundland Dogs at Newfoundland.

A writer in the *New York Herald*, who was one of the excursionists on the late Telegraph expedition to Newfoundland, thus expatiates on the dogs of that uninviting country:

"Any one who has ever visited St. Johns must have observed the large number of Newfoundland dogs with which its streets are beset. You meet them wherever you turn; they lie across the pathway, and sometimes make their bed in the middle of the road; they stand like sentinels at every door, and although they never dispute your passage, they look at you with an inquiring gaze, as if they desired to know your business. In winter they are employed by the poor in drawing wood in sledges, for which they seem peculiarly adapted by their strength and docility. Dr. Kane took twenty of them with him on leaving St. Johns, as they are said to be as good, if not better, than the Esquimaux dogs, in making journeys over the ice. A perfect dog mania broke out among our company, and an extensive trade in pups was opened with the natives. Every person seemed determined to have one, and the consequence was, that we had about as many dogs on our return, as passengers. Dogs of all sizes and ages, from a month to three years old, were carried off unresisting victims into exile. Whatever doubt there might be as to the purity of the breed, there could be no dispute as to their being Newfoundland dogs, and with many, that seemed to be sufficient. Two of my friends bought a pair of them, twins, and named them Telegraph and Cable, in their enthusiasm for the great enterprise. The pure breed, it is said, is fast becoming extinct in St. Johns; but if I should judge from the large number of "full bloods" that were shown to me, I should be strongly inclined to doubt the truth of that statement.

Preventing Incrustations from Hard Water.

MESSRS. EDITORS—In the SCIENTIFIC AMERICAN of Sep. 1st, 1855, there is an article on "Incrustations and their remedy." At Mount Pleasant, Westmoreland County, Penn., there is hard or limestone water used in a double flue boiler, and the incrustation is prevented by simply boiling the water by the exhaust steam before it is used in the boiler. This has been in use here a number of years.

L. D. JOHNSTON.

Mount Pleasant, Sept. 11, 1855.

American Association for the Advancement of Science.—No. 4.

GEOLOGY OF CALIFORNIA—W. B. Blake read a paper on this subject. The rocks of the chains of California mountains are chiefly of granite, gneiss, mica slate, including beds of white limestone and quartz rock. It was generally found that the central or higher part of the Sierra Nevada were of compact granite, but even this was not free from a structural arrangement of the minerals. None of the palæozoic or older stratified rocks were seen—they are either absent or have been metamorphosed. The only stratified formations are those of the tertiary age and the more recent deposits.—The tertiary strata flank the granite elevations, and rest horizontaliy upon the upturned edges of the slates.

The principal point where tertiary strata are developed and characterized by fossils, is at Posé Creek, near the Tejon Pass. Numerous shark's teeth were also obtained from this formation at an elevation of near 1,700 feet above the sea.

The alluvial formations of California cover a broad area. The Sacramento and San Joaquin rivers form extended interior deltas, and the Tulare lakes are bordered by wide plains of barren clay, evidently of lacustrine origin.—The gulf of California probably extended to the head of the valley, 171 miles north of its present limits.

The rocks underlying the city of San Francisco are a compact sandstone lying in thick beds with slates. About midway between the city and the Pacific was a hill of serpentine which he considered intrusive. When the sandstone was exposed to the air it was much discolored; it really had a dark bluish green color. It was suitable for building only where the walls were not exposed to moisture; where they were, it became brown and soft. Mr. Blake was not able to obtain any fossils in the quarries about San Francisco. On the beach, however, were pebbles which he considered to be from a marine outbreak of the sandstone, containing fossils, one of which he exhibited.

Prof. Agassiz held that the fossil which Mr. Blake had shown indicated tertiary age as distinctly as any fossil ever indicated tertiary age. It was a scutella, a genus that had existed from the eocene down to the present day. Now, there were some geological features in this deposit of the utmost interest. The first was that tertiary rocks of such metamorphic character as this were not known in any other locality in the United States.

NEBRASKA, ITS GEOLOGY—Prof. J. Hall read an interesting paper on this subject. The shortest term to express the character of Nebraska was to say that it was a perfect desert, incapable of supporting men or animals except in a migratory condition. The buffaloes came in the spring with the grass and went away in midsummer when it was gone, and the Indians followed them. There was almost no wood; few shrubby willows, and a cotton wood a foot in diameter was always known as the big cotton wood. Pure water was rarely met with. There were occasionally some springs in the baculite formation which commenced 75 miles west of the Missouri. The deep clay beneath was almost impassable: in the spring it was all mud, and in the Summer the clay cracked so as to draw out the roots of vegetation and destroy it. Along the bottoms was occasionally a little good soil, but it was not valuable. This clayey soil was dark but not with organic matter. In the neighborhood of the mouth of the Platte the carboniferous formation terminated. Passing up the Missouri, it is found that the carboniferous passed into cretaceous. At their junction was a sandstone which might perhaps be older than the cretaceous. Upon it lay a bluff calcareous rock, which would mark like chalk, containing scales and jaws of fishes.

Mr. Edward Daniels gave a detailed description of the geological formations of Wisconsin. In the course of it he mentioned a limestone so bituminous that when employed in building the bitumen fried out.

President Hitchcock exhibited the jaw of a fossil shark which he had just received from the coal fields of Illinois. The specimen was about a foot long, recurved like a saber, and on its edge were set in sockets seven teeth with serrated edges. President Hitchcock said that it occurred about three inches above a bed of coal three or four feet in thickness, making it certain that it was in the coal measures.

Prof. Agassiz said that this was one of the most interesting specimens he had ever seen. The idea of a shark was at once suggested, and yet it could not be a shark.

THE ZODIACAL LIGHT—Rev. Mr. Jones read a paper on this subject. From his own examinations while on the Japan Expedition as Chaplain, he came to the conclusion that it was a ring of nebulous matter extending round the earth. He said, "If the zodiacal light comes from a nebular ring around our earth, and within the orbit of the moon, may not the shooting stars, and even the aerolites, have their origin there? Observations show that there is a constant commotion within the ring. May not the nebulous matter half-agglomerated here and there, be shot by these commotions beyond its sphere, and caught by the attraction of the earth, be drawn down, till, striking our atmosphere, they glance in any casual direction, and, taking fire, become consumed, thus giving us the shooting stars!

And may not this nebulous matter, still further solidified, and with a similar fate, afford us the aerolites.

ON THE ASTEROIDS—Prof. S. Alexander, of Princeton, read a paper on this subject, characterized by much ingenuity, but entirely speculative. He had arrived at the conclusion that between Mars and Jupiter there once revolved a planet with an equatorial diameter of 70,000 miles, and a polar diameter of only 8 miles, thus being shaped like a wafer. Having a great velocity on its axis, it burst as some grindstones do, and its fragments formed the asteroids. This theory of the asteroids is brought in to support that of the Plutonists and nebular hypothesists.

INTERMARRIAGES WITH BLOOD RELATIONS—The following is the substance of a paper read by the Rev. C. Brooks on this important subject:—"Stern, yet benignant laws, unknown to us, underlie the great agencies of reproduction. We can only approach to a knowledge of them by facts developed by them. In the offspring of near relations there seems often to be an arrest of normal developement of body or mind. Mr. Brooks produced a long and not very agreeable list of examples, many from his own observation on Martha's Vineyard, where they can persuade few strangers to settle. These prove nothing, as they contain no statistics, and the statistics he used are not new. He comes to the following conclusions, which probably are correct. The laws of breed are the same in man as in other animals; that an unusual number of imbeciles are found in the families of those who have married first cousins; and that few, if any children, born of cousins exceed their parents in bodily strength or mental power. He thinks that further investigations and statistics are wanting, and commends the matter to those who have to do with Islanders, Indians, Gipsies, and Jews.

PHILOSOPHY OF SENSIBLE HEAT—Prof. Hart read a paper on this subject, and attributed heat developed by friction and that by chemical decomposition, such as by combustion, to electricity. He said, "the phenomena of the thermo-electric battery, of the galvanic battery and electrical machine, and a thousand other exhibitions of heat and electricity, notwithstanding there are certain incontrovertible differences—but little greater, however, than those which distinguish electricity from magnetism, are now universally regarded as one.

We know that steam is water, plus some 800 deg. of heat; that vapor of water is likewise HO+a portion of this same something; and yet physicists admit that this latter is a product of the agency of positive electricity, and that it requires the continuous effort of this force to keep it in the vapor form. Accordingly, as a result necessary, we have a fall of rain whenever so much vaporizing force shall have been lost as was originally added to give it the vapor form. Here, then, is a case in which force entered HO in the form of heat, infused by the sun's rays and various heat-producing causes, and came out in the form of the lightning-flash, and the rays which ever come streaming down to the earth.

[To be concluded next week with a review of the whole.]

Cleaning Straw Hats.

Straw hats—such as leghorns, tuscans, dunstables, &c.—when they become soiled, are cleaned as follows: They are first steeped for half an hour in a tub of clean warm water, in which there has been dissolved a little soda ash. This softens the grease, which has been given out to the hats from the hair, and prepares them for the soaping. Each hat is then placed on a smooth board over a tub, rubbed with bar soap, and then scrubbed with a hard hair brush until all the oil, grease, and dirt are taken out. They are then rinsed in two tubsfull of warm water, and left to drip in a basket for about ten minutes, after this they are placed in a clean tub containing dissolved oxalic acid, about 1 deg. in strength. They are sunk in this liquor and left to steep for half an hour, then taken out, and hung up to dry in the air, or a moderately warm room. Before being quite dry, they are removed and subjected to an atmosphere of sulphurous gas in a close box. A few pieces of roll brimstone are placed on the top of some red hot coals in an iron pot, which is set on the bottom of the box, and the lid is closed tightly down. They are subjected to this gas for about six hours, then taken out, sponged well with a strong solution of white parchment size, hung up until they become partially dry, and are then blocked and pressed ready to be trimmed. When straw comes in contact with an alkaline solution like soda or soap suds, it assumes a deep yellow color; the oxalic acid partially removes this, and also any iron stains which may be on straw hats. The sulphurous gas is called "bleaching the straw," but some straw hat cleaners never submit their hats to this part of the process; and their hats look about as well as those who pursue it. It is an offensive process; the gas is exceedingly disagreeable, and if it can be dispensed with it is wisdom to do so. Some use lemon juice as a substitute for oxalic acid, but it is more expensive and not quite so efficacious. Some have used sour milk as a bleaching agent for straw, but it is scarcely possible to wash it out, and it should therefore never be used; vinegar, if rendered colorless by being passed through ground charcoal, is much better. The foregoing process for cleaning straw hats is that pursued by some of the most experienced straw hat bleachers in our country. Care must be taken to remove every particle of grease from each hat, before it is submitted to the acid. Those straw hats which require altering in shape, have their fronts separated from their crowns before being washed; they are much easier handled than entire hats. Ladies who use colored oil for the hair, soon render their hats unfit to wear, as the oil is generally colored with madder or alkanet root, which stains the straw with a permanent color.

Oat Meal and the Intellect.

FOOD FOR TEACHERS.—At the Annual Meeting of the American Association for the Advancement of Education, recently held in this city, Prof. Haldeman advocated the use of highly phosphorized food for teachers, they having much expenditure of brain. He said "the reason why the Scotch were so intellectually acute and active must be attributed to the use of *oatmeal* in their youth. Oats contain more phosphorous than any other vegetable." He also recommended eggs as excellent food for teachers, in order to increase their intellectual capacities. But the mental acuteness and general intellectual strength which characterize the people of the above-named country cannot be due to the phosphorous of their oatmeal, which is their common breakfast food, for it so happens that wheat contains more of it than oats. The quantity of soluble phosphates in wheat, according to Prof. Johnston—himself a Scotchman—is more than one per cent. greater than in oats. In his work on Agricultural Chemistry, pages 503 and 510, the composition of wheat and oats is given in tables.—Oatmeal is, no doubt, very excellent food for man and beast, and so is Indian corn meal, but neither of them will confer intellectual acuteness upon any man. Dull teachers or dull men cannot be made philosophers either by the use of eggs or oats. We must look to some other cause than oatmeal for the metaphysical mind of the North Britons. That cause is, no doubt, to be found in their education, Common Schools having been in existence in that country for two centuries, and the strict *family* training of children by catechisms being similar to that which used to prevail in New England, and various other parts of our country. The Welsh, the Norwegians, and Irish use oatmeal extensively for food.

Zinc.

By the analysis of the most ancient coins, and of metallic vessels taken from the excavations at Herculaneum, it is found that they contain a portion of zinc; yet, to the moderns, zinc is a new metal. Less than a century ago, zinc was not considered as a metal at all.—Homberg, a philosopher who wrote about that period, says: "zinc is a compound of iron and tin;" thus implying that it had no individual existence, but that it was a compound. Such, however, is not found to be the case by modern chemists. Indifferent as we are to a "bit of zinc," there are few substances that have rendered more service, or been more instrumental to the cause of science and the progress of knowledge than this metal. Considered in relation to its own qualities, it possesses rare interest. Certain combinations of this metal with copper, under the euphonious names of *tombac*, *brass*, *pinchbeck*, have been used in the arts, especially in China, from time immemorial. In the Celestial Empire, zinc in great purity is used for current coin. This money has frequently Tartar characters on one side, and Chinese characters on the reverse. Certain combinations of zinc, and called white vitriol (*i. e.* sulphate of zinc,) and another flowers of zinc (oxyd of zinc,) are of great importance in medicine. The mechanical uses of metallic zinc are very numerous, giving rise to regular trades for the fabrication of zinc ware. The white oxyd of zinc is coming daily into use as a harmless substitute for the poisonous white lead in painting. Iron chains and wire exposed to the air or water, are all now dipped into melted zinc before they are put to use.—This operation, which is called galvanizing, entirely prevents the iron from rusting. There are many other uses of zinc, but which we cannot detail here. The great service, however, which zinc has rendered to man is in the galvanic battery. Without electricity many arts would cease to exist, yet, for practical and commercial purposes, we could not generate electricity without zinc. What steam owes to coal electricity owes to zinc. Whenever steam is used, coal is consumed; whenever electricity is used, zinc is consumed. Thus we find that electro-plating and the wonders of telegraphic communication are indirectly indebted to zinc; and by the use of the telegraph we are enabled to answer Job (xxxviii., 35) in the affirmative, who 2000 years ago asked: "Canst thou send lightnings, that they may go and say unto thee, 'Here we are!'" SEPTIMUS PISSEB.

Reducing the Cost of Tunneling for Railways.

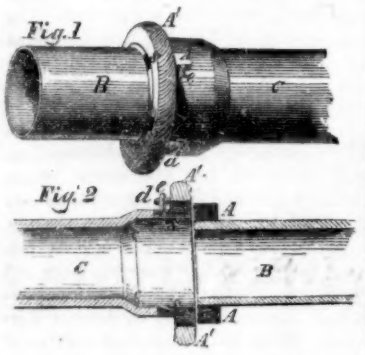
Mr. Charles McCally, a Civil Engineer of the North-western Virginia Railway, in a communication to the *Railroad Record*, throws out some suggestions upon the policy of changing the form of locomotives and cars, so that a large reduction may be made in the size of tunnels, and consequently in the cost of opening them. He thinks that "the cost of constructing roads through such rough countries as north-western Virginia, where there is much tunneling and bridging, may be diminished twenty per cent." He says: "Suppose we bring the smoke stack down to a hight of ten feet, and the cars to a hight of nine feet; this would leave enough vertical space in the cars for the accommodation of passengers, and two and a half feet for them to be above the rail. It would require an entire change of form, simply, of locomotives. The principle would remain precisely the same. The engine, to bring all of this working apparatus in so little space with respect to hight, would of course require space, with regard to length, in the same proportion, so that the power of the engine would not be diminished. This change would interfere with the comforts of the traveling public to a very small extent; but what consideration is that when we reflect that by using the same capital we would have used without the change, we have twenty per cent. more railways; that our country, upon the same principle, is benefited twenty per cent. more than it would have been."

New Inventions.

Waterhouse's Hose Coupling.

The accompanying figures represent the improved coupling for hose, for which a patent was granted to Albert M. Waterhouse, of this city, on the 19th of June last.

B C are two sections or lengths of hose or water pipes. The one, C, has its metal coupling on one end, flaring or expanded from *c c*, to receive one end of the other coupling section of B, which has two projections or catches, A A, cast upon it. There are two slots, S S, cast in the flared end of the section, C, to receive the projections, A A. There is also a nut ring, A', on the outside of the flared end, which is capable of being moved partially round, and has two slots in it to correspond to those S S. When the slots in the ring, A', are brought into line with those S S, the projections, A, on section B, are pushed into them, and the two lengths of hose are then in proper position for coupling, or locking them together. This is done by simply turning the ring, A', partially round, so as to throw its slots out of line with the lugs, A. The two sections of hose cannot then be pulled apart. This method of coupling is simple, and can be truly and rapidly performed, even by night in the dark. There is a small pin, *e*, on the ring, A', and another, *d*, on the flared end of section C. When these two pins are brought into contact, the slots in the ring and pipe are in line, so as to allow the catches or projections, A, to be pushed in to couple the pipe, or drawn out to uncouple, and this can be done without looking at the pipe,



for when these pins are out of contact it is a sign that the sections of pipe are coupled, and vice versa. They are, therefore, coupling gauges, and in this character are very useful. This coupling can be made as strong as any in common use, and it can be more quickly operated than the common screw couplings.

More information may be obtained by letter addressed to the patentee, at No. 150 Bowery this city.

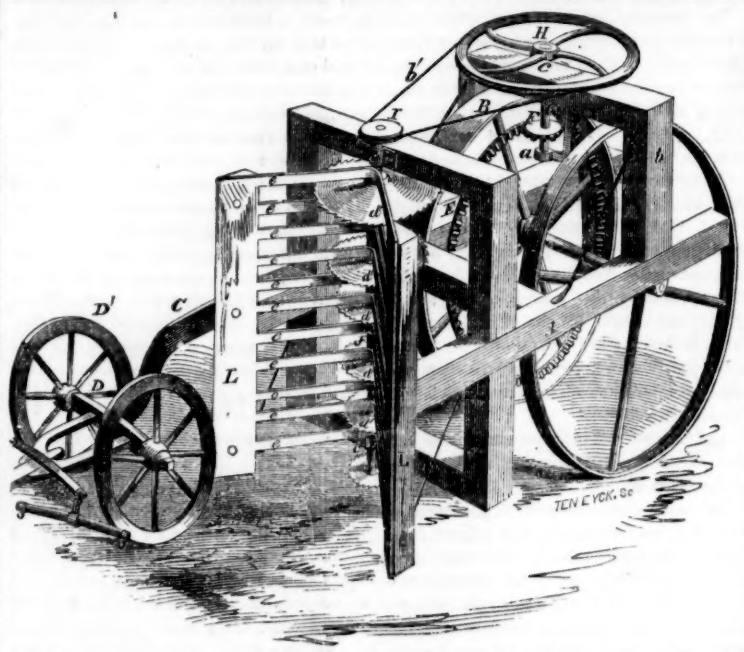
Cutting Cotton Stalks.

This figure is a perspective view of a machine for cutting standing cotton stalks, invented by J. W. Bocage, of Cypress Mills, near Pine Bluff, Arkansas, whose patent has just been issued, the claim of which will be found in another column.

The nature of the invention consists in the employment of a series of circular saws placed upon a vertical shaft, and rotating between angular bars, which answer the purpose of fingers; the whole being placed and secured in a wheeled carriage, which is drawn through the cotton field with mules or horses, and the saws rotated by gearing from the drawing wheel, so as to act against the standing corn stalks and cut them down.

A is a stout frame for supporting the machinery. It is sustained on the back and front wheels, B D'. The perch, C, is connected to the front axle, D, as in an ordinary wagon. A beveled gear rim, E, is secured to the spokes of one of the hind wheels, B. A small pinion, F, on a vertical spindle, G, gears into it. This spindle is secured in the cross piece, *c'*, and a pendant brace supported by standards, *b*. H is a pulley on the upper end of spindle, G. A belt, *b'*, passes around this pulley, and another small one, I, on the top of the saw spindle, which gives it a rotary motion—and consequently the saws, *d' d'*—as the machine is drawn forward. The saw spindle is secured in strap bearings, *c c'*, on the top and bottom cross pieces of the frame. The saws, *d'*, vary in size, the lower one being of the least diameter and the size of them gradually increasing upwards—the top one being the largest. They are placed at suitable and equal distances apart. Six of these are represented in this machine,

MACHINE FOR CUTTING STANDING COTTON STALKS.



them (about one-quarter of their disks project through the spaces.)

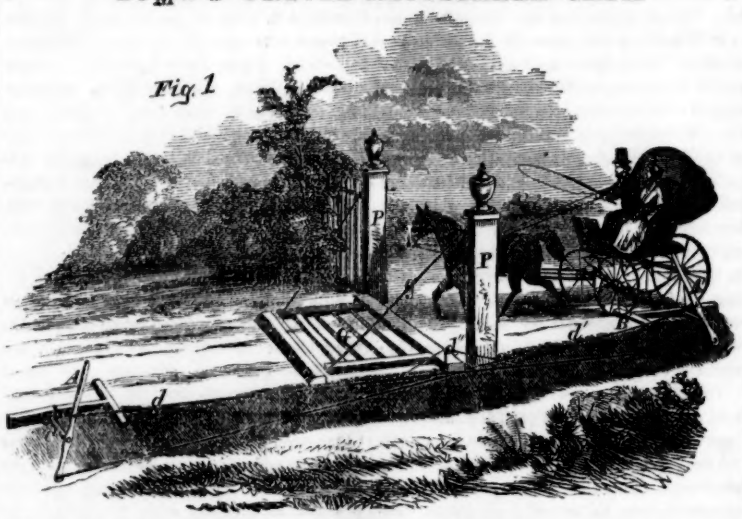
OPERATION—The team is attached to the pole of the carriage in the common way, and as the machine is drawn along, the cotton stalks are caught by the angular frame, L, and forced towards the corner or angles of the bars or fingers, *e'*, holding them firm for the circular saws to act upon them and saw them down. As the saws decrease in diameter downwards, the upper part of the stalks will be cut down first; in other words, the stalks are cut successively from their upper to their lower ends.

Saws are superior to knives for cutting cotton stalks by machinery in this manner, as they can be operated with less power, are more easily sharpened, and not so liable to get ou of repair.

Great activity has been displayed in the West and South-western States within the past few years, in all kinds of agricultural machines, especially the larger kinds, for superseding the most severe and expensive kinds of labor. The result of all this has been unbounded success. Machines are still wanting for picking cotton, and for other branches of agriculture, and the above one is intended to supply a place as a useful improvement, for the purpose set forth.

More information may be obtained by letter addressed to Mr. Bocage, at Cypress Mills.

LUM'S I PROVED ADJUSTABLE GATE.



The accompanying engraving is a perspective view of a modification and improvement, by Henry B. Lum, of Sandusky, Ohio, of his very convenient Gate, patented on the 17th of May last, and which was illustrated by a different view from the above, on page 353, Vol. 10, SCIENTIFIC AMERICAN.

G is the gate, the bars of which, when on the ground, sink between planks of a platform, so that the carriage will run smoothly over it. The bottom bar of the gate is hinged to a sill, or swings on side pivots; the top bar is connected by two cords, *g g*, to balance weights in the inside of the hollow posts, P P, these cords run over pulleys. A A', are two vibrating levers, to which cross wires, *d d'*, are connected, as shown—the end of one to the foot of a lever, and its other end connected above the lever's axis. Another wire or rod, *d''*, connect these two wires to the gate by a staple.

B B', are crotchet trippers for operating the levers and their wires to open the gate.—The one, B, is connected to lever A by a spindle, C, and the other, B', to lever, A', in the same manner. A small catch is shown on axis C, at B, for catching like a clutch, to make the lever A' or A vibrate and actuate the gate throwing it open. The carriage wheel strikes the cross head of B, and carries it down, operating the levers and throwing open the gate as shown. The horse at this time has commenced to step upon the flat gate, and it is kept down while the carriage is passing through. A small platform is placed upon the ground, and the round portion or axis, C, is laid across it and secured by staples, and in a groove, so as to allow it to partially turn in the same, to accommodate the vibrations of the levers. The lower end of B is heavier than the upper end; it rights itself after the vehicle has passed, and the gate closes. It is thus a self-acting gate, adapted for all kinds of roads, and an excellent one for the crossing of railroads, as it may be made to be operated by the cars. It will be understood, that a person on horseback, by taking hold of the top of any of the levers, A A', will also open this gate in the same manner as the other gate, illustrated on the page referred to, and close it in the same manner.

These gates are worthy of general attention, and Mr. Lum deserves great credit for the ingenuity he has exhibited, and the perseverance he has displayed in improving and bringing them to their present state of perfection. The same principle of action can be applied to various gates.

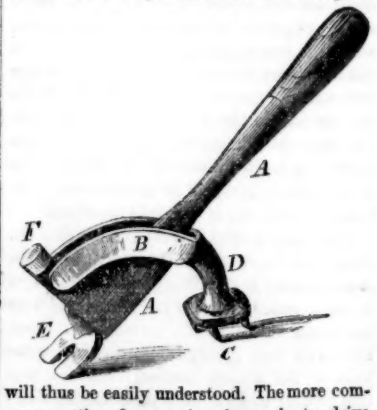
More information may be obtained by letter addressed to him at Sandusky.

Taft's Patent "Box Opener."

The accompanying figure is a perspective view of the spener or tool for opening the lids of boxes for which a patent has been obtained by George C. Taft, of Worcester, Mass.

The nature of the invention consists in a lever with a brace connected to it by a pin passing through both to form a joint, so that when the short end of the lever is forced under the lid of a box, and the foot of the brace brought in contact with the side of the box, the brace will form the fulcrum for the lever to raise the lid.

A is the lever, and E its forked sharp toes, for inserting between the lid and side of a box. D is the brace with claws, C, on its heel. It has two side pieces, B, with an opening between them, in which the lever is allowed to play in exerting a purchase to open the box. F is the head of a hammer forming a part of lever A, above its shoulder. A fulcrum pin is inserted through the jaws of B, under the hammer head, F, on which both the brace, D, and lever, A, vibrate. The brace is firm and stationary, while the lever operates on a lid. The parts



will thus be easily understood. The more common practice for opening boxes is to drive down a chisel between their lids and sides and then to pry open the lids. By so doing, the lids of the boxes are split, and the edges of their sides injured, so as to render them unfit for as good a purpose afterwards. The object of this tool is to enable persons to open boxes with great ease and rapidity and to save their lids and sides, and render them capable of being used over and over again.

To use the tool, the toes, E, are forced vertically between the lid and side of a box, and the heel, D, of the brace is pressed down upon the side, or on another part of the top, or on the edge of the box, and is most convenient for raising the part of the lid to be lifted. Pressure is then exerted on the end of the lever, A, as on a crow bar, and the lid is forced up. The lids of boxes are generally formed of more than one part; these can be raised one after another by this neat, compact, and powerful spener with great facility, and without splitting the wood. It is a very convenient box wrench and hammer, well adapted for opening the light boxes in groceries, shoe stores, &c.

More information may be obtained by letter addressed to Taft & Gleason, Worcester, Mass.

First Patent on Marble Saws.

By reference to the record of Patent Claims, which we this week publish, it will be observed that one marble saw patent has been granted. Another batch may be soon expected. See our remarks under the claim above mentioned.

Models without the inventors names are very plenty in our office. Those who are careless in this respect will feel disappointed in not hearing from us.

The Genessee Powder Mills, near Rochester, N. Y., blew up with terriffic violence on the night of ihe 12th inst.

Scientific American.

NEW-YORK, SEPTEMBER 22, 1855.

The New Metal, Aluminum.

When in 1807, Humphrey Davy applied the galvanic current to a piece of moistened potash, and produced therefrom the peculiar metal, "potassium," chemistry passed with a single leap from a narrow into a boundless circle. People were astonished at the discovery of metal in a substance which had long been employed for making soap, and which was obtained from the ashes of the very wood used for heating their rooms and boiling their kettles. On the heels of this, there followed the no less memorable discovery of the metal "sodium," in the very salt used for seasoning food, and the lime used for making mortar; in short, it was made evident by Davy that much of the materials of our globe, previously known as "earthy substances," were nothing less than the rust of various metals. Among the various earths, few would have thought that common clay, used for making bricks and puddling embankments, contained a metal; but, like potash, soda, and lime, it was submitted to the *experimentum crucis* by Wohler, and gave up its secret, also. It was found to be the oxyd of the metal "aluminum." This is the metal which has recently been brought so prominently before the public, in France, by M. Deville, as noticed by us in our last volume. Although its existence has been known for many years, still it never was obtained before, except in a spongy, and very subdivided state, and it really may be called "a new metal," so far as its application to the arts is concerned.

Its properties are peculiar. It is two and a half times heavier than water, only one-eighth that of platinum, and one-third that of iron, so that it is exceedingly light. It is white, like silver, but has a slightly bluish tinge. It is malleable, and very ductile; it can be drawn out into the finest wire, or beaten into the thinnest plate, and in this respect it resembles gold. It is a superior conductor of electricity, and is stated to surpass copper in this respect. The melting point of it is a little higher than that of zinc; it does not easily oxydize; water appears to exert no action upon it, and it is nearly unalterable in the atmosphere. It appears to hold a position between the precious metals—platinum, gold, and silver—and the common ones—iron, copper, lead, and zinc. Its chemical properties are, therefore, invaluable, and if it could be produced in large quantities, and at a moderate price, it would revolutionize the arts. It has already been formed into delicate watch-wheels, and watches made with them have been presented to various high dignitaries by the French Emperor. We fear, however, that it cannot be produced in large quantities, nor at a moderate price, because it has to be reduced by acids, and then precipitated with an alkali, like the precious metals, and these processes are slow and expensive. Thus far, it has been obtained by M. Deville, of Paris, alone, in the form of ingots, capable of being worked into articles of use and ornament; there is, therefore, a wide door still open for improving the processes of its reduction. Two things are absolutely necessary for producing it at a moderate price: first, an abundance of rich raw materials, and secondly, a simple and cheap reducing process. Aluminous shales, in comparison with iron, copper, zinc, and lead ores, are not abundant, and thus, at the very first step, there appears an insurmountable obstacle to its cheap manufacture. If the processes of obtaining it, however, were improved, more attention would be devoted to prospecting for rich deposits. Some valuable discoveries of these might reward our own, as well as other countries. These hints we throw out for the benefit of all whom they may concern, viz.: the whole scientific world.

The Great Chemist of the Universe has displayed his wisdom, power, and skill, in various combinations of alumina. It occurs almost pure in those two precious stones, the *sapphire*, and the *ruby*—the one blue, and the other red in color—which possess a hardness but little, if any, inferior to the diamond, It is also found in the *topaz*, in the *lapis lazuli*, and in *corundum*. In the arts, alumina forms the basis of some of the most beautiful colors, such as the Adrianople red, and the Alkanet-root lilac. It forms the basis of the beautiful porcelain from which we quaff the Chinese nectar, and of it is made the pyrometer, for measuring the highest degrees of temperature in furnaces. As the compounds of alumina are so abundant and useful, it is to be hoped that the pure metal itself will yet become as common, as its excellent and peculiar qualities will enable it to fill a space in the arts for which there is no substitute.

Encroachments on the Patent Office.—The Remedy.

We publish in another column some communications from Washington respecting the encroachments upon the Patent Office, to which we alluded a week or two since. We invite special attention to the remarks of our correspondent. It would appear from his statements that the Secretary of the interior, Hon Robert McClelland, entertains a deep hostility to the Patent Office, and that he is evincing the same by systematic but indirect attacks against its vitality and usefulness.

The ambitious Secretary seems to us grieved to think that this branch of the public service, though it was founded under the immortal Washington,—though it has ever been fostered and encouraged by our greatest statesmen,—though they erected for its exclusive use one of the most noble and spacious edifices which adorn the national capital,—though it has served more than perhaps any one department of the Government, to elevate, to benefit, and to strengthen the Republic,—though it flourished for years before its present assailant, or the office over which he is now, unfortunately, the chief, was thought of; this ambitious Secretary, we say, is grieved to think that the Patent Office enjoys so excellent a fame, and stands so high in the affections of the American people. He seems pained to reflect that the noble pile, out of which both himself and predecessors have stolen space for their clerks and account books, still bears its world-renowned title of "United States Patent Office." He longs to obliterate those living letters, and to substitute in their place a new sign—"Department of the Interior." He longs to clip the Patent Office of its attractions; to diminish its glory; to subordinate its chief-ship. He longs, in short, to have the world know that there is such a personage as the Secretary of the Interior. He sighs for the exclusive occupation of an imposing palace to give him that official dignity and importance which he now lacks. But while the Patent Office flourishes, all these ambitious schemes remain unsatisfied; the people will look upon the Patent Office building with veneration, and regard the Commissioner of Patents as an important officer of the Government. Hence his covert attacks; his undermining operations; his disguised hostility.

Now, we have no objection to the gratification of the Secretary's personal pride; we should be pleased to have him glorify himself to the highest pinnacle of fame, if he chooses. But we cannot countenance the unworthy mode he takes to accomplish his purpose. Like the fox in the fable, he seeks to make the Patent Office his goat, to coax it into the well, and then, rising on its horns, leave it behind helpless in the lurch. Such proceedings are unworth of any man,—much less a member of the Executive Council of the nation.

There is a remedy for all such annoyances and troubles, which, sooner or later, we hope to see adopted. It consists in the creation, by Congress, of a Bureau of Invention, the Minister thereof to enjoy all the advantages that the other chief officers of the Government possess. At present the Patent Office appears to be regarded, by certain officials, as a sort of hybrid —neither one thing nor the other. Without proper independence, or even the power to regulate its own concerns, they pay it little respect, though all the while they must be sensible of its importance as an Institution.

Let the Patent Office be raised from this uncertain condition, in some such way as we have indicated, and no envious Secretary of the Interior will longer have power to check its growth, confuse its business, and destroy its usefulness.

American Genius Triumphant.—Remarks on Reaping Machines.

The intelligent Paris correspondent of the *N. Y. Times*, mentions, in a late letter, the gratifying fact that an American piano, manufactured by A. W. Ladd, of Boston, has been found worthy of a prize by the International Jury. This result justified, fully, the general opinion expressed of this piano, in our hearing, by several operators. They declared that it felt better under the touch than any of the pianos on Exhibition, thus expressing the highest possible compliment to the mechanical skill displayed in its construction.

"The specimen in question is to obtain a silver medal, and the President of the Jury informed the agent that, *had it been in tune*, it would doubtless have won a gold one. This is altogether the most significant result that can possibly be furnished to Americans by the Exposition of France. That a piano from Boston should come unheralded into the domain of the famous instruments of Erard, Pleyel, and Herz, and only miss the first prize by an accident of inattention, is truly remarkable."

It is also believed and currently reported in Paris, that the Jurors will award medals to McCormick's, Manny's, and Wright's reapers, to Pitt's thrasher, to Avery and Singer's sewing machines, to Richmond's plate metal cutter, and to Blanchard's bust-turning machine. The same letter also announces the sale of one of Manny's reaping machines to Prince Napoleon, and the patent right for France to a company. We are the more glad to herald this fact, for the reason that considerable fun had been poked at the American Department of the Exhibition, and because the agricultural industry of France needs the application of our improved implements; but in consequence of the abundance of hand labor, and owing to the extreme subdivision of the land, such admirable inventions are not likely to succeed as well in France as they do here and in England.

There are plenty of large farmers, however, who will eagerly avail themselves of these machines, and it appears to us that a fine field is opening in France for this class of American inventions. We shall not be surprised to learn that Manny, McCormick, and Wright, with their reaping and mowing machines, and Pitts with his grain thrasher and separator, find themselves richly paid for their enterprise in sending their machines to the great Congress of ingenuity. If we mistake not, one of the results of this exhibition will be to open a fine market for American machines generally, for, with all the boasted superiority of our maternal friends in Europe, Yankee ingenuity is a thing not to be sneezed at.

In connection with the subject of agricultural implements, we have a few words of advice to give our inventors and manufacturers of reaping and mowing machines, and first of all we present the following extract of a letter from Z. Leavenworth, of Leavenworth, Indiana, as a proper text on the subject:

"I wish to get another mowing machine. I have one of Ketchum's, (made 1853,) but it runs heavy, and one of easier draft is desirable. I have been watching in vain for the report of the Massachusetts Committee which gave the premium of $600. All the committees appointed to examine reapers, and report on their merits, have failed in giving correct and reliable information, inasmuch as they have omitted to give the draft or power required to operate each machine. At fairs, the agents or proprietors of reapers and mowers, are sure to have choice teams for the purpose of working their machines in the most rapid, and apparently easy manner. Many of such machines, when obtained by farmers, have failed to give satisfaction because of their great draft—much greater than can be overcome by common teams on farms. (I have noticed the same thing at fairs with plows.) The power required to operate reapers, is a most important item to our farmers."

These remarks of our correspondent touch a most important point in relation to such machines, and we recommend it to the attention of all committees appointed to judge of reaping and mowing trials. It is no less important to the inventors and makers of these machines; they must be aware that if one reaper can do as much work as another, with one-third or one half less power required to draw it, there is just so much saving in the working expenses of the farmer. It is no positive evidence of superiority in a machine, that it should, in a trial, surpass its competitors by a few minutes of time in cutting down a certain amount of grain. It may have been more ably handled, and its team may have been superior to all the others. If the *Paris Constitutionel* of August 7th is to be believed, this appears to have been the case with the McCormick reaper in the French trials. It is well known from common reports, that it surpassed all the others in speed of execution, and that it was cheered triumphantly by the assembled multitude, but it is now asserted that it did not make such a favorable impression on the minds of the best judges of such matters as Manny's machine; the latter was more admired because of its compactness and lightness of draft.—The *Constitutionel* states, that arrangements have been made for the manufacture of 1000 of these machines in Paris, for the harvest of next year. Hussey's, McCormick's, and Wright's reapers, operated well, but they were more cumbersome, and of heavier draft than Manny's, whose agent, Mr. Mabie, was offered 120,000 francs for the patent at the end of the last trial. We are convinced that great improvements will yet be made on reaping machines—principally in their workmanship and arrangement of parts, so as to render them more compact, easier of draft, and therefore of more undoubted value to our farmers.

A New Observatory.

A new and elegant observatory has been erected in Albany, N. Y., on an elevation north of the city, which commands a fine view of the Hudson valley for a great distance. It is not yet furnished with instruments, but these are in the course of construction, and before another year transpires it will be supplied with an able corps of astronomers, and all the necessary apparatus for the most refined observation of the starry heavens. It is to have a heliometer for measuring the angular distances of separate stars. The means to purchase such an instrument were furnished by Mrs. Dudley, an aged widow lady of Albany, who gave a check for $6,000 within a few minutes after the subject was submitted to her consideration by Thomas W. Olcott, Esq. There are but two such instruments in the world, the one at Königsberg, Prussia, and the other at Oxford, England. The object glass of the heliometer is divided in halves. Each half gives a distinct image of every star submitted to the observer, so that by moving the halves far enough apart the image of one star can be made to coincide with another, and the distance by which the halves of the object glass are separated from each other gives the angular distance of any two submitted stars. The construction of such an instrument requires the highest exercise of skill in astronomical mechanism. Its erection does great credit to the citizens of Albany. A few years since, an association was formed in Brooklyn for the purpose of erecting an observatory, but, so far as we have been able to learn, it has done nothing towards accomplishing the object for which it was organized.

Recent Foreign Inventions.

PLATING METALS—F. S. Thomas and Wm. Tilley, of London, have obtained a patent for coating lead, iron, or other metals, with tin, nickel, or alumina. The following, from the London *Mechanics Magazine*, is a description of the process, taken from the specification of the patentees.

"The first part of our process," says the inventors, "consists in a mode of preparing a solution of the metal with which the articles are to be coated or plated, for which purpose we proceed as follows:—For tin we dissolve metallic tin by nitro-muriatic acid, and then precipitate the tin by an alkali, or alkaline salt, preferably by the ferro-cyanide of potassium; we then mix sulphuric acid or muriatic acid with the precipitated oxyd of tin, to which we add a portion of water; these we boil in an iron vessel with a small portion of ferro-cyanide of potassium, then filter the liquor, and the solution is completed.

Another mode of forming a solution of tin is as follows:—Having precipitated the oxyd of tin, as above described, we add ferro-cyanide of potassium to the oxyd and boil them; then set the solution aside to cool, and then filter the same; we then pass a stream of sulphuric acid gas through the solution.

For nickel, we dissolve nickel by nitro-muriatic acid, and precipitate the oxyd by ferro-cyanide of potassium; we then wash the oxyd, and add thereto cyanide of potassium dissolved in distilled water; then boil the mixture, and when cool filter the same, which completes the solution of nickel.

For alumina, we dissolve alum in water, and add ammonia until it ceases to precipitate any more; we then wash the alumina, filter it, add thereto distilled water, boil the same with cyanide of potassium, filter when cold, and the solution of alumina is ready.

Having thus obtained either of the foregoing solutions, the articles to be covered or plated are suspended by copper or brass rods in a bath of the required solution, and attached to the zinc pole of a battery, to the positive pole of which is attached, in the case of a tin bath, a piece of platinum, or a pole of tin in the case of a nickel bath, a bag containing oxyd of nickel, or a pole of nickel, and in the case of a bath of alumina, a bag of alumina, or a pole of alumina, or a piece of platinum."

VARNISH FOR PROTECTING IRON SHIPS FROM CORROSION—Joseph Westwood and R. Baillie, of Poplar, England, have taken out a patent for the above named purpose. Both the interior and exterior of iron ships are subject to rapid oxydation, and although it is well known that various varnishes form good protective coatings, it has been found almost impracticable to make them adhere to the metal. This invention has for its object the perfect adherence of a protective coating. The patentees first put on a coating of common black varnish, then a coating of boiled oil and black lead, with a little arsenic to prevent the adhesion of barnacles on the outside of the vessel. The composition of the black varnish is not given in the specification, but we suppose it is the common kind for black iron work. It is made by boiling slowly 48 lbs. of asphaltum for four hours in an iron pot, and then mixed with it six gallons of hot boiled linseed oil, made sticky by 6 lbs. of litharge introduced into it, and boiled for a few hours. It is ladled out hot from a pot into the boiling asphaltum, and the two boiled for about an hour. When cool, it is reduced with turpentine to the proper consistency for being put on with a brush. About two pounds of lamp black may be added, to improve its color.

MAKING WOVEN FABRICS WATERPROOF—James Murdoch, of London, patentee.—This invention makes cotton cloth waterproof by the application to its surface of the following varnishes:—In three gallons of water, half a pound of alum, one pound of ox gall, and two pounds of linseed cake, are boiled for one hour, then allowed to cool, and applied with a brush to the surface of the cloth to be coated, which is afterwards placed in a stove room to dry. The next coating is composed of 3 gallons of linseed oil, 1-4 lb. of litharge, 1-2 lb. of india rubber, 1-2 lb. of tar, and 1-2 lb. Prussian blue—the latter as a coloring material. These are boiled for about an hour, and well stirred all the time, when it will form a strong varnish It is now allowed to cool, and is put on the surface of the cloth with a brush or machine. The cloth is then allowed to dry again in a stove room, and when dry, its surface is rubbed with pumice stone to make it smooth. The third and last coat is composed of three gallons of linseed oil, boiled over a strong fire for two hours, with two ounces of the salts of tin, and the same amount of the sulphate of zinc—both dryers. This varnish may also be colored with Prussian blue, or other coloring material. When cold, it is applied to the surface of the cloth like the other coatings, and the cloth is afterwards dried in the same manner. The last coating is given with a thin copal varnish. This method of preparing cotton, or coarse hempen woven cloth, to make them waterproof, may be very useful information for our oil cloth manufacturers.

PREPARATION FOR SUGAR REFINERS—In some stages of sugar refining, and in Turkey red dyeing, bullock's blood, in a natural state, is used, and in this condition it is difficult to carry and disagreeable to keep. To obviate these evils, J. Pillars, of London, has taken out a patent for pressing the clotted blood of animals into cakes, then drying them with currents of hot air. It is afterwards ground to powder in a machine, and in that state is used by sugar refiners and dyers. This is certainly a valuable improvement over the old method, if it answers as good a purpose, and the attention of all sugar refiners should be directed to it. The serous portion of the blood, which has been pressed out, is dried like the clotted parts, and is supplied to calico printers for using with their colors, and also to the refiners of wine, for their operations, as a substitute for the white of eggs.

[For the Scientific American.]

Encroachments on the Patent Office.

As your journal appears to be the only one through which inventors, and those interested in the general success of the Patent Office, can be reached, I have taken the liberty of calling your attention to the fact that, ever since the completion of the East Wing of the Patent Office building, a manifest disposition has grown up to crowd the Department out of its edifice entirely. These attempts to cripple the Office began with the last Administration; but the crowning act is left for the present Secretary of the Interior. Not satisfied with bringing into the building his own immediate retinue of clerks, he must also crowd in the Census Bureau, and more recently he has occupied one entire floor with the Land Office and its regiment of clerks. Worse still, another fiat has gone forth, and the Patent Office must be pushed further to the wall to admit the Indian Office; and thus a building erected for the special accommodation of inventors, is about to be wrested from them.

The causes for thus circumscribing the Patent Office, to any but a politician, will appear ridiculous. In the first place, it is deemed that the *importance* of the Department of the Interior, is lost sight of, because it is in a part of the Patent Office Building. This detraction from the magnitude of the "Interior" Department, is to be remedied by some little Act of Congress, asking for an Inspector of Sealing-wax and Tape, or some other equally unimportant Act, in which the name of the building is to be changed from the U. S. Patent Office to that of "Department of the Interior," and a new sign put up in accordance. Secondly, many persons, the Secretary fears, may innocently suppose, from the name of the building, that the Commissioner of Patents out-ranks the Secretary of the Interior. This is an underrating of the Secretary's importance, which he cannot tolerate or forgive.

The Patent Office cannot be used as a political engine, hence, to a mere politician, its insignificance.

Now, let any one visit the Patent Office, and then say whether it has any room to spare:—models, which cost thousands upon thousands of dollars, are heaped up a huge unsightly mass,—under the vestibule, under the portico, under any thing where there is storage room. Other models are in rooms so darkened by the mass of material, as to make an inspection of them impossible. Clerks are crowded inconveniently together; the examiners have no private apartment where they can keep pending cases from public inspection,—yet with such facts before his eyes, the Secretary of the Interior complains that the Patent Office is too much "spread out"—that they must restrict the Office to less room. Now all this plainly means that the Patent Office is to be turned out of doors, and the Department of the Interior is to take possession of the building. The Land Office is already in the West Wing, and yet there is no roof on it. Squatter sovereignty appears to be the order of the day. There is but one thing more to do, and I do not place that beyond the intent of the present Secretary, viz.: to order that part of the main gallery, which is in the Western Wing, to be cut up into rooms for the Pension, or some other Department.

The Patent Office is unfortunately conditioned at present. There is no Commissioner of Patents, as you are aware, and before one can be appointed, another and fatal blow will be struck. The Secretary of the Interior, or some of his bad advisers, are determined that the Patent Office must contract itself still more. The present Acting Commissioner, a perfect gentleman and faithful officer, has not the power to stop these encroachments. It strikes me, that if President Pierce, straightforward, practical man as he is, knew it, he would clip the wings of this aspiring Secretary. The columns of our city papers cannot be had to call attention to the attempts of the Interior Department to smother the Patent Office, and unless you will do it, we must sit and look on whilst we are robbed of our fine building, for the purpose of gratifying a few aspirants who imagine that they are overshadowed by it.

Strangers coming to our city invariably first visit the Patent Office. Its contents have elicited unbounded astonishment and praise from citizens and foreigners. This is probably to her prejudice, as she detracts, by her contrast, from the other branches of the government, whose officers imagine that they are the shrine at which strangers should worship. The Patent Office, it is trne, has not her agents and sub-agents, her receivers and her registers, who are scattered broadcast all over the country, and whose duty it is to cater to the taste of the hand which for the time feeds them, but she has among her votaries the mechanics of the country, who shun politics to devote their time to their pursuits, and thus build up the reputation of their country. These men should know how their labors are appreciated here—how the emanations of their hard study, and the work of their hands,—their time, and their means,—is cared for by the Secretary of the Interior. A knowledge of these facts ought to arouse the whole community of inventors and mechanics, to a rescue of their beautiful building from its invaders. ——.

Washington, D. C., Sept., 1855.

More Encroachments on the Patent Office.

In addition to my former communication, I have now to say, that the Secretary of the Interior, in direct violation of the second section of the Act of 1839, which expressly places that power in the hands of the Commissioner alone, has removed four of the temporary clerks of the Patent Office: they were ladies, to be sure, but among them were the very best copying clerks in the Office, and one of them the daughter of a man who served faithfully in the Office for twenty-five years, and who, since her father's decease, has been supporting, by her pen, his entire family. This act may appear small, but is not so in reality; it takes away from the Commissioner one of the prerogatives of his office, and clearly shows that the Secretary of the Interior intends, by an assumption of power, not given to him by any law or precedent, to manage, control, and direct the affairs of the Office to suit his own purposes and ends. But further: this act not only aims at taking away from the Office its privilege, but another object is gained. The room occupied by these clerks will be taken possession of by him for the Land Office, which is thus beginning to elbow its way, rom the west Wing, into the Patent Office proper. Two important objects gained by the Secretary of the Interior in this move, and having "broken the ice," he doubtless supposes that he may now proceed further without hindrance.

You may think that I overrate the designs of the Secretary of the Interior, and that my fears are not founded on facts. In answer, I would say that ten years' intimate and close connection with the Office, in all its phases sustains me in the opinions I have formed. When such men as Buchanan, Webster, and Forsyth, were perfectly clear that the law establishing the Patent Office, gave them, as Secretary of State, no power whatever over her affairs, except to confirm or refuse to confirm nominations made to them, and to sign patents, it is not surprising that we should scoff the action of a "fourth-rate man," as Secretary of the Interior, who, without any change in the law organizing the Office, sets at defiance the deliberate opinions of his predecessors in office and stops at nothing to accomplish his ends.

When application was first made for rooms in the Patent Office building, the then Secretary of the Interior pledged himself that he would go no further than merely take a *few rooms* for himself and his immediate clerical force, which was small. This he did, and from thence dates the downfall of the Patent Office, unless its friends and supporters step in to prevent it. One encroachment has followed another, until the independence of the Patent Office is crushed out, and its rights in the building expressly provided for it by law, are usurped by others, who allege that "the Patent Office is but simply one of the Bureaus of the Department of the Interior, and has no more right to superior accommodations than the Land Office, the Pension Office, the Indian Office, or the Census Bureau, which are equally branches of the Department of the Interior."

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Washington, D. C., Sept., 1855.

The Power of Belting for Driving Machinery.

MESSRS. EDITORS—In a late number of the SCIENTIFIC AMERICAN, I see a communication from Mr. Charles E. Moore, on the subject of machine belting, wherein he speaks of there being no rule for calculating its powers, &c. I have therefore taken the liberty of sending you the following rules for that purpose; they are from a number of such rules on various subjects connected with mill work, that I have, from time to time, collected from practical memoranda and personal experience, during some forty years spent among and constructing steam engines, both stationary and locomotive, steamboats, water wheels, and mill work of all kinds. The rules I have made use of for belting, and found to answer perfectly, are those of an eminent machinist of your city; they are as follows:

Rule 1. "To find the width of a belt necessary to transmit any number of horses power."—Multiply the horses power to be transmitted by the constant number 5400, divide the result by the velocity of the belt in feet per minute, multiplied by the diameter of the smallest drum (also in feet,) for the width of the belt (in inches) required.

Rule 2. "To find the power of a belt when its width, velocity, and diameter of pulley are known."—Multiply the velocity of the belt in feet per minute, by the diameter of the smallest drum (in feet,) and by the width of the belt in inches. Divide the result by the constant number, 5400, for the number of horse power such a belt will transmit.

Rule 3. "To find the diameter of the smallest drum, when the power, velocity, and width of the belt are known; multiply the horses power by the constant number, 5400. Divide this result by the velocity of the belt, in feet, per minute, multiplied by its width in inches, for the diameter of the smallest drum in feet.

As a belt is soon destroyed by over-straining, these rules are calculated to give some 25 per cent surplus power before it will slip materially. No belt should be worked up to its full power, and as Mr. Moore says, "the slack side on the top, with large drums at high velocity; a long slack belt will work for years, but a short one, under heavy strain, is soon destroyed. When the power to be transmitted is considerable, say fifty horse and upwards, it is best to use gearing at the first mover if you wish to avoid trouble and loss of time.

R. F.

Philadelphia, Sept. 14, 1855.

The Crystal Palace is receiving machines for the Exhibition of the American Institute.

TO CORRESPONDENTS.

J. H. G., of Ky.—The subscription price of the London daily *Times* is $45 per annum, exclusive of postage. Wilmer & Rogers receive subscriptions at their office, corner Liberty and Nassau sts., this city.

J. B. B., of N. Y.—Woolen yarn, if perfectly free from grease and wet, before being entered in the dye kettle, will never be uneven if carefully handled, unless the skeins are tied too tight. You may depend upon it that the clouding can all be avoided by careful working.

W. H., of Vt.—It is probable that your former inquiries were answered in our column "To Correspondents," and escaped your attention. Water will rise in a vacuum 32 feet, by the natural pressure of the atmosphere. By the use of air pump and the application of power, the atmospheric pressure may be increased, when the water will rise proportionately. Liquids may thus be raised to an indefinite hight. This is one of the oldest plans of raising water, and was long since abandoned. If your device operates on these principles, you may be assured that it will create no sensation here, for we have seen many such contrivances. The common lift pump will do the same work cheaper. Hence the latter is preferred to any atmospheric arrangement. $1 received.

J. H. G., of Iowa—We are not aware of common earth ever having been heated as you describe, and pressed into brick. If they are superior to common brick, and can be made as cheap, then the improvement is valuable, but not otherwise.

J. S., of R. I.—Saws for cutting marble ought to be hung horizontally, and receive a peculiar dipping motion to cut well. It is exceedingly difficult, if possible at all, to hang the saw blade perfectly true and straight.

H. P. T., of Mass.—A rifle and musket loaded with the same kind and quantity of powder, and same weight of ball, will not project their separate bullets to the same distance. The rifle's will be carried furthest, because it will receive the greatest amount of the powder's force, owing to its resistance in the barrel, just like that water wheel the water of which leaves it without motion, having expended its force on the wheel.

J. M. C., of N. Y.—The Woodworth patentees have set up a claim that the rotary sash machines infringe their patent. We have never made specific inquiry into the matter, but we presume John Gibson, of Albany, has some decisions on this subject.

H. F. B., of ——.—You did not give us any clue to your residence, therefore we could not answer your letter by mail. The refrigerator appears to be a novel affair, and we see no reason why it cannot be patented.

C. C., of Ohio—It would be impossible to procure the model from the Patent Office. The law would not allow the Commissioner to surrender it.

H. B., Jr., of Pa.—There is no chance for a patent on your wrench. A spring catch has been before used in a similar manner.

J. R. E., of La.—Address the Scoville Manufacturing Co., at Waterbury, Ct. They make daguerreotype materials. There is a journal on Photography now published here, Humphrey's. $2 received.

W. R. D., of Ohio—We do not know of any published work devoted especially to steam engine valves. The subject is more or less treated in all works devoted to steam engineering. Tredgold's work is expensive.

J. D., of Ind.—If we knew the actual head of the water used in the Ram described in Ewbank's Hydraulics, we might be able to answer your question. If it threw two-thirds the water 200 feet high, the head of water would require to be about 70 feet. The account is no doubt exaggerated.

A. A., of Pa.—Ransom's artificial stone, is not for sale here, so far as we know. It being made of a solution of caustic soda and pure sand, these materials can be obtained everywhere, but not the solution. Mathiot's articles on Electrotyping were published in Vol. 6, Sci. Am.

T. J., of Va.—It will take an engine of twelve horse power to drive a four feet circular saw, and will cut about 4000 feet of oak lumber per hour, if carefully managed.

W. P. G., of Ohio—There are many valuable receipts on varnishes in back volumes of the Sci. Am., but we may present some others in future numbers.

P. B., of Conn.—The marine glue of Jeffreys consists of india rubber, 15 ounces, dissolved in chloroform, to which is added some mastic, and the whole allowed to macerate for about a week. It should be so thin as to be put on with a brush.

S. P., of Vt.—For such information as you want communicate with Mr. W.

W. L. P., of Ill.—A self-weighing apparatus was patented a few years ago, but we do not remember the patentee's name. We have an impression that it has been put into use in Chicago. You had better send us a sketch and description of your plan, and we will advise you in regard to its patentability. The model should not exceed one cubic foot.

M. C., of Mass.—In regard to the time kept by the English railway trains, the statement of punctuality is all gammon: we have had some experience on English roads, and we can assert with confidence that the trains do not run up to time with any greater certainty than the trains on our own roads.

J. K. G., of Mich.—In volume 4, page 86, Sci. Am., you will find the specification of Woodworth's Planing Machine as it was re-issued. Please refer to it for the information your seek.

P. S., of D. C.—Your alleged improvement in straps and pulleys for transmitting power, does not, in our opinion present any thing new. The principle is the same as the chain belt passing over a pulley with suitable projections for holding it.

R. W., of N. Y.—An automatic car coupling is nothing new. Companies do not seem to have faith in them.—Your ideas in regard to sawing stone are not out of the way, but they are not new.

S. M., of Md.—Personally, we are not acquainted with the practical working of the wheel to which you refer. We have seen a model of it, and believe it to be good; that is all.

J. J, T., of Ky.—Jeromn & Co., of New Haven, Conn., are the most extensive mantel clock makers in the world? Sugar preserved fruits do not require to be put up in hermetically sealed cans. It is very difficult to preserve fruit unless it is scalded in syrup and put up in sealed bottles.

A. W., of Pa.—It would be a good plan for you to allow your wheel to dry, then paint the rusted iron with a coat of hot boiled linseed oil. This, with the rust, will make a very permanent paint, if allowed to dry.

F. W. P., of Md.—We do not know the price of Wilmot's apparatus. Address him.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Sep. 15, 1855:—

G. L., of N. Y., $30; G. T. P., of N. Y., $55; C. B., of N. Y., (L. I.,) $57; J. H., of N. Y., $30; R. K., of N. Y., $20; S. B. D., of N. Y., $40; A. W. S., of Vt., $25; S. T., of N. Y., $30; C. W. R., of Pa., $30; C. T. C., of N. Y., $10; C. W. B., of Ct., $45; D. W. C., of Ct., $48; S. E. T., of N. Y., $30; B. G., of Vt., $30; E. G., of Vt., $30; T. H. C., of N. Y., $30; E. R. B., of Ct., $10; W. & B., of Mich., $25; D. H. & W., of Mass., $27; J. L. P., of Miss., $30; C. T. W., of Mass., $25; W. W. & Co., of N. Y., $50; C. & T., of Wis., $30; J. S., of Ind., $30; E. M., of Wis., $30; A. M. G., of N. Y., $30; C. P. S. W., of N. H., $25; W. P., of Miss., $25; F. & P., of N. Y., $25; J. C., of N. Y., $25; A. H., of N. Y., $25; D. W. H., of Mo., $32; W. K. L., of Md., $30; J. P. G., of Ill., $30; J. S. S., of N. Y., $30; J. B., of Ct., $10; E. S. & Co., of Ct., $267; J. B. L., of Fla., $60; E. L. H., of N. Y., $30; J. K. T., of N. Y., $25; H. M. C., of Ct., $40; D. E. T., of N. H., $25; J. G. K., of N. J., $25; P. & W., of N. Y., $25; M. P. D., of N. Y., $25; D. D. M., of N. Y., $25; J. E., of Mass., $25; C. B., of N. Y., $25; H. & B., of N. Y., $30; H. G., of N. Y., $50.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Sept. 15th:—

C. W. B., of Ct.; A. W. S., of N. Y.; J. G. K., of N. J.; P. & W., of N. Y.; M. P. D., of N. Y.; W. & B., of Mich.; E. P., of Ct.; C. D. M., of N. Y.; C. T. W., of Mass.; J. E., of Mass.; D. H. W., of Mass.; C. B., of N. Y.; G. T. P., of N. Y.; G. W. B., of L. I.; A. H., of N. Y.; F. & P., of N. Y.; C. P. S. W., of N. H.; W. P., of Miss.; J. C., of N. Y.; H. & B., of N. Y.; H. G., of N. Y.; D. E. T., of N. H.; H. W., of Wis.; J. K. T., of N. Y.; J. A. B., of Mich.; H. M. C., of Ct.

Science and Art.

Single and Double Steam Engines.

One of our correspondents—John Gill, of Patriot, Ind.—in a postscript to his letters, makes the following remarks respecting the above subject, which has been alluded to on two former occasions, in previous numbers of the SCIENTIFIC AMERICAN:

"Has any one tried double and single engines with the same boilers and machinery, so as to give a fair decision as to which used less steam? I have always been under the impression that one engine of double capacity, and plenty of fly wheel, used steam more economically than two, but have never seen a fair trial. To have it tried aright, all the engines ought to be equally good; for if you take out a badly constructed engine, and put in two of better make and more scientific proportions, as a matter of course, you would do more work with the same boilers. This is an important matter to be settled, there being some advantage in regularity in working two engines; but, by using well constructed spring couplings, the back lash of a single engine can be mostly done away."

[We have no record of any such experiments as those to which our correspondent refers; it is, indeed, positively necessary that the conditions for a trial should be those which he describes. The common opinion respecting the use of double and single engines is, that the former produces a more steady motion than the latter, and are therefore to be preferred for driving machinery; but it is not generally believed that they use less steam.

Ames' Universal Square.

The annexed engravings represent and illustrate a "Universal Square," for which a patent was granted to Nathan Ames, of Saugus, Mass., on the 6th of July, 1852, but never before thus brought before the public. This square is simple, and combines in a convenient form five useful instruments, viz., the "Try-square," the "Miter," the "T-square," the "Graduated Rule," and the "Center-square," for finding the center of a circle.

Fig. 1 is a perspective view of the instrument; fig. 2 shows the method in which it is applied as a center-square for centering a circle; fig. 3 shows the different ways in which it is applied as a miter, and fig. 4 shows the application of the instrument as a T-square, a try-square, and a graduated rule.

In the Patent Office Report for 1852–3 is the following description of the instrument, and its application as a center-square:

"The general principle on which the instrument is based is well known to geometricians, viz.: that if two tangents (or straight lines touching the circumference of a circle) be extended till they intersect each other, a straight line bisecting the angle between them will pass through the center of the circle. The instrument consists of two arms, A B and A E, fig. 1, placed together at right angles to each other, in the manner of a carpenter's square, but of equal thickness, and having their surfaces 'flush,' upon the upper surface of which arms a straight ruler, D A, is fixed at its end in such a manner as to have one of its edges at the inner angular point of the arms, and that edge extending midway between them, or bisecting the angle between them. The ruler can be braced firmly by a bar, B E, running across between the extreme ends.

"If the mechanic wishes to find the center of a circular wheel, he places the instrument upon it, fig. 2, with the two arms both resting against its circumference, in which position the edge of the ruler will run across its center. A straight line is marked in this position, and the instrument is again applied to another part of the circumference, so as to mark in the same manner another line intersecting the first. The point of intersection is, of course, the center of the wheel. The whole is the work of a moment."

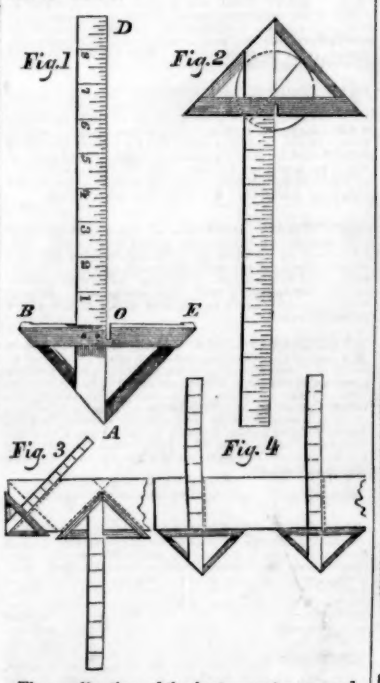
The first claim of the patent is for the application to an instrument of the geometrical principle alluded to above; and the second for the union of the above with the common try-ing square by means of the bar, B E.

At O, fig. 1, is a slot in the bar, B E, to admit a scratch-awl, or the point of a knife. This slot is also cut out in such a manner on the under side, that the point of the marking instrument may pass under the bar, making a continuous mark, whenever it is desirable, from D to A.

As a center-square, alone, the instrument is invaluable to every mechanic.

A glance at fig. 3 will explain the different ways in which the square may be used as a miter. By simply placing the instrument over a square corner to be mitered (as seen at the left of the figure), without any adjusting by the eye, is sufficient: the tongue cannot fail to bisect the angle. By mitering both corners, the longitudinal center may also be readily found, the point where the two lines intersect being equidistant from the two edges. The point where the tongue leaves the edge of the board will also be found to be just the width of the board from the end.

Or, again, as seen at the right of fig. 3, there are two miters more. The cross bar, B E, fig. 1, resting against the edge of the board, the two sides of the square, B A and A E, will both be miters.



The application of the instrument as a graduated rule, T-square, and try-square, will be easily understood by inspecting fig. 4.

As a T-square, it is peculiarly strong, and free from liability of getting out of true. The tongue, D A, being fastened, as it is, into the triangular frame, B A E, cannot be moved or knocked from its place. The same remark, of course, will also hold in regard to the instrument both as a miter and try-square.

It is also obvious that there are other ways than those represented in fig. 4 in which it may be applied as a try-square. That portion of the tongue between D and O, with either half of the cross-bar, B E, forms a complete carpenter's try-square, and may be used as a substitute for it in every instance. The outside of the frame—the angle, B A E—is also a perfect square, and often very convenient. In short, it combines, in a most convenient form, so many useful instruments, no mechanic's list of tools can well be complete without a Universal Square.

More information in regard to the instrument may be obtained by letter addressed to the patentee.

New Copper and Silver Mines.

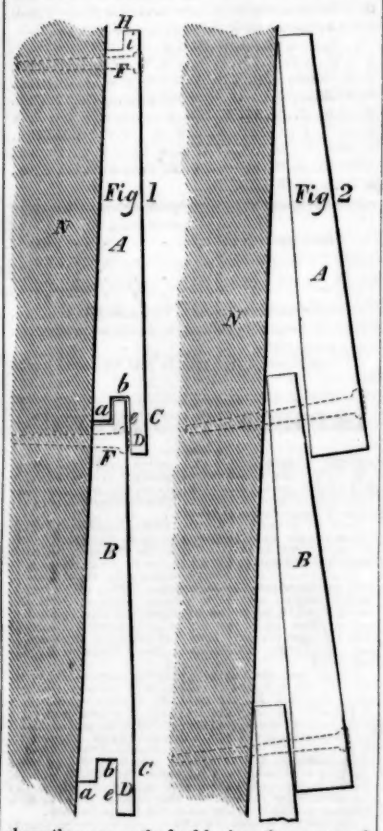
California papers announce the discovery of new mines of the above metals, which are very promising in richness. They are located 30 miles from the Gila river, and 25 miles north of the new boundary line between Mexico and the United States. It is designed to transport the ore and metal for shipment in small river steamers to the Gulf of California, where it will be taken on board and shipped to the Eastern States or England for smelting. The ore is said to be inexhaustible, and increasing in richness as it is followed. Not far from this locality is the celebrated silver mine of Mina de Plancha de Plata.

We imagine that the projectors of this enterprise will find a rather sorry business, so far as profit is concerned, to transport their ores, first to the Gila, and thence by different shipments to this coast or England.

Baker's Patent Clapboard Jointing.

The annexed figures are two views of an improved method of jointing clapboards for the siding of houses, for which a patent was granted to William Baker, of Utica, N. Y., on the 16th of May, last year.

The nature of this invention consists of a peculiar matching of the boards, so that they stand edge upon edge, instead of hanging upon the nails in the usual way; the chief characteristics of clapboarding being still preserved in one board overlapping the other, to shed the rain. Fig. 1, is a section of these boards nailed against the frame of a house to



show the new method of laying them up, and the jointing of them; and fig. 2, is a side view of the common old method of clapboarding. A, B, are two of the new clapboards nailed to the stud, N. *a*, *b*, *e* show the matching cut of the lower end of a clapboard. It is made to correspond with the upper edge. H, which has a lip, *i*, so that the two will fit together, as shown at C. The line, *e*, of the cut is a little oblique, to correspond to the front line of the board, so as to make one board fit close to the other. The first board, B, being laid on and nailed at F, the lower edge of the next board, A, when brought to its place, as shown, will be firmly held at the lock *a*, *b*, *e* and the nail, F, will be completely covered by the lower extended lip, D, without nailing. The lip, D, is made about three-fourths of an inch in length, and the lips, *a*, and *i*, are each about one-fourth of an inch long. The difference between the methods of clapboarding, as shown in the two figures, will at once convey a just idea of the superiority of the new one. When a house is clapboarded in this manner, not a nail can be seen, and the matching is much tighter and stronger. These boards are made by splitting a thicker board diagonally through in the ordinary way of making two feather edge clapboards; and the machinery of Mr. Baker, for doing this, also cuts the proper matching on the edges, at the same time, and as fast as common clapboards are made. The boards, it will be observed, lie flat against the stud, N; whereas, by the old plan, fig. 2, they only touch the studs at the corners. At the place where they are nailed (fig. 2) they are not truly in contact, so that they are liable to be split in nailing, for the want, of a solid bearing to drive against. A small nail can be used for the new clapboards, as it is driven through one board only and at the thinnest edge, so that there is no danger of splitting. These boards can be put up more rapidly than the common kind, and they make a much tighter, more handsome, and warmer building.

More information may be obtained by letter addressed to the patentee, at Utica.

Worth a Trial.

It is stated that Mr. John Brush, of Brooklyn, N. Y., has saved the plums on a number of trees, the present season, by binding bunches of tansy upon the limbs, in several places. The fruit upon the trees thus treated ripened to perfection, while that near by, not thus protected, was entirely destroyed by the insects.

Literary Notices.

PATENT REPORTS—We are indebted to the Hon. Wm. H. Seward, Senator, to Hon. A. C. McClelland, Secretary of the Interior, to S. T. Shugert, Esq., Acting Commissioner of Patents, and to Hon. John Wheeler, for copies of the report of the Commissioner of Patents for 1854. This report is decidedly the finest specimen of typography issued under the auspices of the government that we have seen for a long time. Accompanying the usual reports of statistics and claims of new patents, there is an extra volume of diagrams, which are intended to illustrate, in part, the prominent features of each invention patented during the year. These diagrams are necessarily so reduced as to occupy but a small space, while, being in outline, they are not very attractive to the eye. As an appendage to the report, they will prove of convenience, and will otherwise materially enhance its value as a book of reference. The diagrams were first drawn and engraved upon copper, then transferred to wood, from which they are printed. This volume of outlines was originated by the Hon. Charles Mason, late Commissioner. We trust they will be continued every year. In addition to the foregoing, we have received from Mr. M. C. Gritzner, C. E., a separate volume of the same diagrams, the impressions being all taken from the original copper plates. The drawings were made by Mr. G., under government orders. They reflect great credit upon his skill as a mechanical draughtsman. The plate impressions are much more clear and exact in appearance than the wood prints. Mr. Gritzner's volume is also better arranged, and some inaccuracies contained in the official volume are corrected. The price of the volume is $3,50, with the Commissioners report gratis. Address Mr. Gritzner as above, at Washington, D. C., for copies.

FORRESTER'S PLAYMATE—For September—is received. This is a capital magazine for the young. Its contents are original, and its illustrations very good and appropriate. While it has articles upon a great variety of subjects, its chief design seems to be to teach boys and girls to think for themselves. Above all, "its moral tone," as the New York *Churchman* truly remarks, "is unexceptionable," and parents need have no fear on that point. The work is edited by Mark Forrester, an old and favorite writer for the young folks. Among other interesting novelties in the editor's chit-chat for this month, is an enigma, for the best solution of which is offered a copy of Harper's Family Bible, worth twenty-five dollars. The *Placemate* is published monthly, at a dollar a year, by William Guild, & Co., Boston, Mass. The July number begins the third volume.